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Taxonomic Notes on Lepidostomatid Caddisfiles and Description of a New Species from Japan (Trichoptera)

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ABSTRACT

The males, females, larvae and larval cases of *Goerodes albicornis* (BANKS, 1906) n. comb. and *Goerodes kasugaensis* (TANI, 1971) n. comb. are described. Male, larva and larval case of *G. albicornis* and female, larva and larval case of *G. kasugaensis* are described for the first time. *Goerodes nukabiraensis* (KOBAYASHI, 1964) is synonymized with *G. speculifer* (MATSUMURA, 1907). The males, females, larvae and larval cases of *Goerodes iriomotensis* n. sp. are described from Iriomote Island, in the southernmost part of Japan. They had been erroneously recorded under the name of *G. arcuatus* HWANG, 1957.

Key words : Trichoptera, Lepidostomatidae, larva, new species.

INTRODUCTION

The Lepidostomatidae are one of the most intensively studied families in Japan, and comprise 5 genera and 35 species (ITO *et al.*, 1993 ; ITO, 1994, 1998). However, the generic assignment of some species is not yet clarified because their larval stages are unknown, and larval characters are essential in establishing true affinities in this family (MOSELY, 1939 ; ROSS, 1946 ; ITO, 1984, 1990 ; WIGGINS, 1996).

Dinarthrodes albicorne (BANKS) and *D. kasugaensis* TANI have been described using female alone from Kyushu and male alone from Honshu, respectively. In this paper, I describe the male, larva and larval case of the former species and the female, larva and larval case of the latter species for the first time, and transfer the two species to the genus *Goerodes* based on their larval characters.

In addition, I synonymize *G. nukabiraensis* (KOBAYASHI, 1964) with *G. speculifer* (MATSUMURA, 1907) based on an examination of the holotype. I also describe *G. iriomotensis* n. sp. from Iriomote Island, in the southernmost part of Japan, which was erroneously recorded under the name of *G. arcuatus* HWANG, 1957 by myself (ITO, 1992).

Filiation of adult and larva was established by rearing larvae to adults, by dissecting mature pupae to examine their genitalic segments, and by examining larval exuviae in pupal cases. Terminology used in this paper mainly follows that in my previous paper (ITO, 1984). Type specimens are deposited in the collections of the Natural History Museum and Institute, Chiba (CMB-ZI), and other specimens are deposited in the author's personal

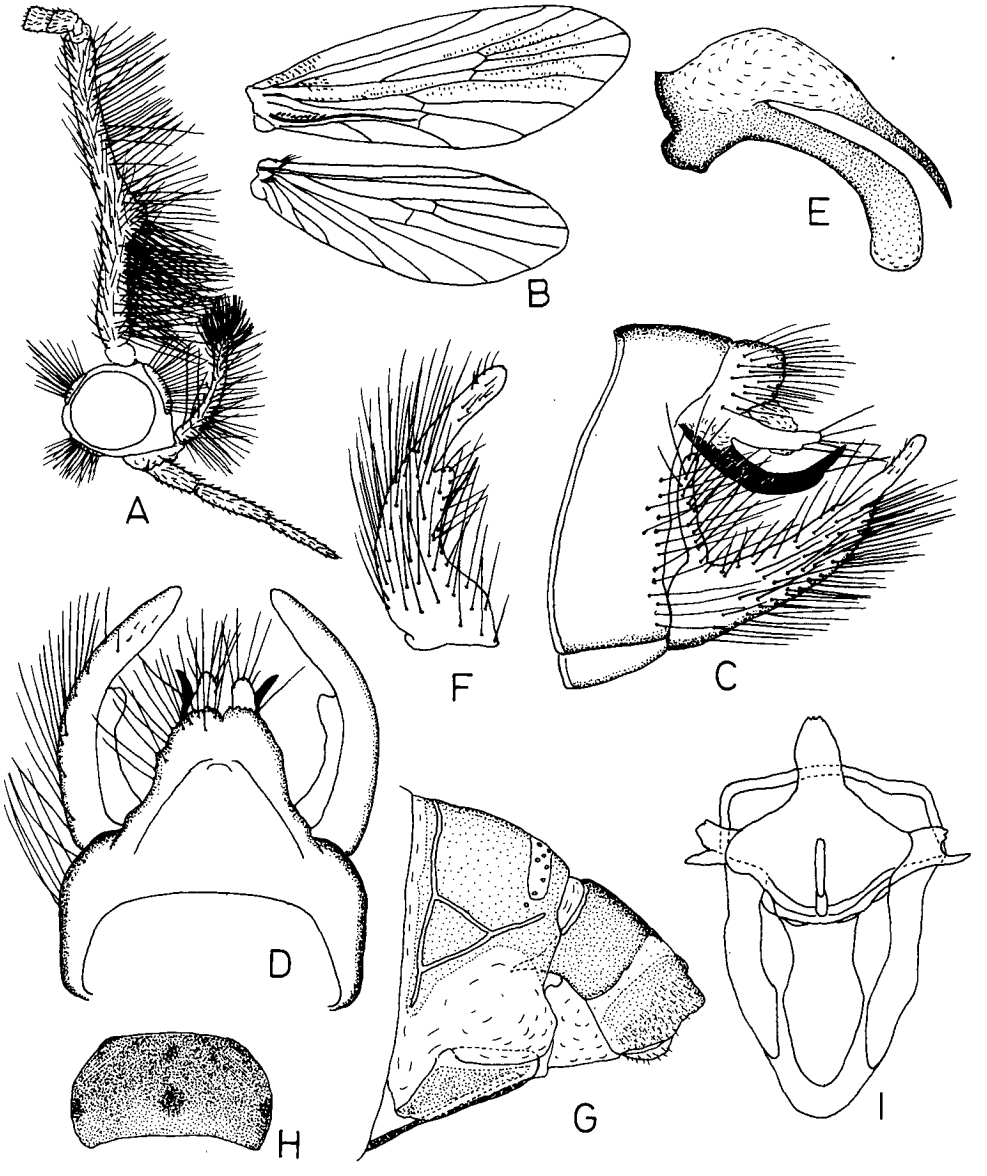

Fig. 1. *Goerodes albicornis* (BANKS, 1906). Male (A-F) : A, head, scape and mouth parts, lateral ; B, wings ; C, genitalia, lateral ; D, same, dorsal ; E, aedeagus and paramere ; F, inferior appendage, ventral. Female (G-I, holotype) : G, segments VIII-X ; H, subgenital plate ; I, vaginal apparatus.

collection.

Goerodes albicornis (BANKS, 1906) n. comb.

[Japanese name : Shirotsuno-kakutsutsu-tobikera]

Crunoecia albicornis BANKS, 1906, 109, head, scape and mouth parts of

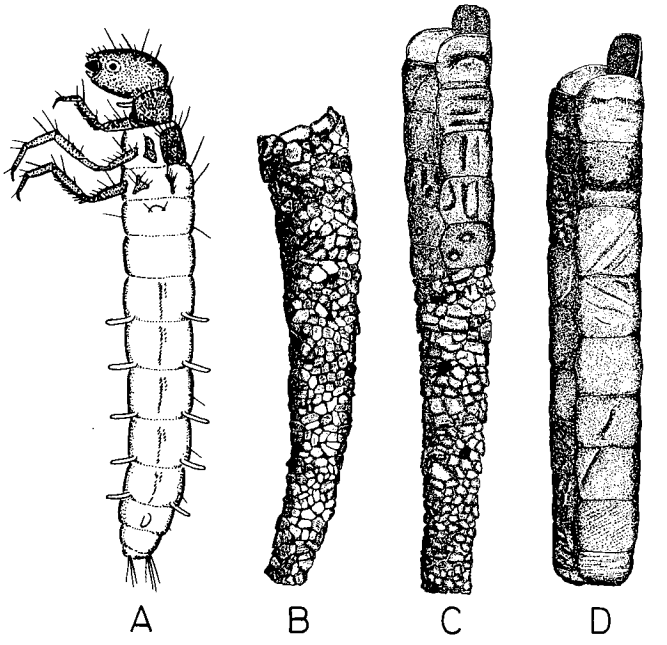

Fig. 2. *Goerodes albicornis* (BANKS, 1906). Larva (A). Larval case (B-D) : B, beginning of 5th instar larva ; C, early half of 5th instar larva ; D, end of 5th instar larva.

female.

Dinarthrodes albicorne : WEAVER, 1985, 244-245, female vaginal apparatus.

Male (Fig. 1A-F). Brown, 5-6 mm long. Antenna *ca.* 9.5 mm long. Scape (Fig. 1A) 1.9 mm long, 5 times as long as head ; a process present half way ; densely covered with long and short setae. Maxillary palpus (Fig. 1A) not segmented ; thick scale tuft present on the top. Labial palpus 3 segmented, 1.2 mm long in total ; covered with short setae.

Fore wing (Fig. 1B) 9.9 mm long, 3.3 mm wide ; apical forks I and II present ; discoidal cell *ca.* 1.7 mm long ; thyridial cell 2.2 mm long. Hind wing (Fig. 1B) 8.2 mm long, 2.8 mm wide ; discoidal cell 0.8 mm long.

Genitalia (Fig. 1C-F). Tergite X composed of mesal arm, lateral arm and membranous lobe. Mesal arm (Fig. 1C, D) round in lateral and dorsal views. Lateral arm (Fig. 1C) divided into inner and outer lobes at base ; inner lobe bar-like, directed posteriorly ; outer lobe heavily sclerotized with acute apex, directed postero-ventrally at first, curved dorsally at apical 1/3. Membranous lobe directed ventro-posteriorly. Paramere (Fig. 1E) thick, membranous at basal half, thin, sclerotized at apical half. Aedeagus (Fig. 1E) thick, membranous at apical 1/4.

Inferior appendage (Fig. 1C, D, F). Main article thick at basal 2/3, abruptly thinned at apical 1/3, round apically (Fig. 1C). Superior harpe bar-like, long, directed dorsad (Fig. 1C).

Female (Fig. 1G-I). Brown, 6-7 mm long. Antenna *ca.* 9 mm long. Scape

1.8 mm long, 3.2 times as long as head. Fore wing *ca.* 9 mm long and *ca.* 3 mm wide. Hind wing *ca.* 7.5 mm long and *ca.* 3 mm wide. Venation of wings as in other Japanese species of *Goerodes* (ITO, 1984).

Lateral margin of tergite VIII (Fig. 1G) largely concave. Lateral plate (Fig. 1G) triangle and sclerotized weakly. Subgenital plate (Fig. 1H) subsquare with convex lateral margins and slightly concave posterior margin. Tergite IX separated from tergite X (Fig. 1G). Vaginal apparatus (Fig. 1I) trapezoidal with irregularly protruded lateral projections.

Larva (Fig. 2A). Head width and body length of 5th instar larvae up to 0.9 mm and 10 mm, respectively. Numerous small spines present on dorsum of dark brown head. Pronotum wholly sclerotized dorsally concolorous with head, with some indistinct light colored dots, a dark colored line near posterior margin, bearing about 35-45 setae on anterior margin to anterior half; mid-dorsal ecdysial line clear; antero-lateral corner round and postero-lateral corner subsquare. Mesonotum separated into 2 dorso-lateral plates by a very narrow dorsomedian membranous line, somewhat lighter than head and pronotum; antero-lateral corner subsquare and postero-lateral corner round. Metanotal area broadly membranous, slightly sclerotized at the base of setal area (*sa*) 1, *sa* 2 and *sa* 3. About 30-40 setae on meso- and metanota, 1 on *sa* 1 of mesonotum; 1 on *sa* 1 and 3 on *sa* 2 of metanotum; 2 setae on *sa* 2 of metanotum very short.

Single posterior tracheal gills present in subventral and subdorsal rows of abdominal segments III-VII. Other characters as in *G. naraensis* (ITO 1985b).

Larval case (Fig. 2B-D). Cylindrical sand case at early instars and four-sided leaf piece case at 5th (final) instar. Materials and shape changed at early half of 5th instar. Length of four-sided case up to 12 mm.

Specimens examined. Japan. Kyushu. [Fukuoka] Lectotype. ♀, Hikosan, Buzen, 28.IV. (deposited in Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, Type 11830, abdomen dissected and cleared). 30♂7♀ 2 pupae (1♂1♀), 73 5th and 15 4th instar larvae, brooklet, Hikosan Biological Laboratory of Kyushu University, Hikosan, Soeda-cho, 26-28.IV.1993, T. ITO (TI). 2♂, ditto, 19.V.1993, N. KUHARA (NK). 1 larva, ditto, 7.IV.1997, A. OHKAWA (AO). 9♂2♀, brooklet, Takasumi-jinja, Hikosan, Soeda-cho, 19.V.1993, NK. 3♂, ditto, 6.V.1997, H. NISHIMOTO (HN). 7 larvae, Buzenbo, Hikosan, Soeda-cho, 22.V.1996, T. HATTORI (TH). [Ôita] 2♂2♀, headwaters of Nishiyama-gawa, Ume-cho, 23.V.1993, NK. 1♀, tributary of Nishiyama-gawa, Ume-cho, 23.V.1993, NK.

Habitat. The larvae were found in brooklets 30-40 cm wide in forests often with the larvae of *G. naraensis*.

Distribution. Japan (Kyushu).

Remarks. This species was originally placed in the genus *Crunoecia* MCLACHLAN (BANKS, 1906) and tentatively moved to the genus *Dinarthrodes* ULMER based on the female wing and antenna scape by WEAVER (1985). However, the typical character of the genus *Goerodes* ULMER (ITO,

1984) is found in the larva of this species, in particular sclerotization and chaetotaxy of the thorax. Thus, this species is transferred to the genus *Goerodes*.

This species belongs to the *naraensis* group of *Goerodes* (ITO, 1984), since male tergite X is symmetrical, male inferior appendage is not bifurcated apically, and larval case is changed from a cylindrical sand case to a four-sided leaf case at 5th instar. The adult and larva of this species are very similar to *Goerodes naraensis* (TANI) (ITO, 1985b) and distinguishable from the latter only by the shape of male tergite X, female vaginal apparatus, and abdominal gill arrangement of larva.

Goerodes kasugaensis (TANI, 1971) n. comb.

[Japanese name : Kasuga-kakutsutsu-tobikera]

Dinarthrodes kasugaensis TANI, 1971, 63-64, male ; TANI, 1977, 200, male.

Male (Fig. 3). Body brown, 7.5-8.5 mm long. Antenna 12-13 mm long. Scape (Fig. 3A, B) 2.5 mm long, *ca.* 4.5 times as long as head ; flattened dorso-laterally in some specimens ; small break present 3/5 from base ; basal 3/5 covered with scales and setae, apical 2/5 covered with long and short setae ; short basal process and protuberance present on the dorso-mesal surface ; protuberance covered with thick, black setae. Maxillary palpus (Fig. 3A) 3-segmented, 0.9 mm long, densely covered with scales and setae. Labial palpus (Fig. 3A) 3-segmented, 1.2 mm long, covered with short setae.

Fore wing (Fig. 3C) 7.5-8.5 mm long, 2.8-3.1 mm wide ; apical forks I and II present ; discoidal cell 1.5 mm long ; fold along Cu2. Hind wing (Fig. 3C) *ca.* 6.0 mm long, *ca.* 2.5 mm wide ; apical fork I present ; discoidal cell *ca.* 1 mm long.

Genitalia (Fig. 3D-G). Tergite X composed of mesal arm, lateral arm and membranous lobe. Mesal arm triangular with small outer lobe in lateral view (Fig. 3D), subsquare with small square outer lobe in dorsal view (Fig. 3E, F). Lateral arm heavily sclerotized, very long, directed ventrad at first, curved dorso-laterally half way. Aedeagus curved ventrally. Paramere thin, distinctly shorter than aedeagus.

Inferior appendage. Main article (Fig. 3D, E) thick at basal half, abruptly tapered at basal 3/4, thickened distally in lateral view. Ventral hook (Fig. 3D, E) arising near middle of ventro-mesal surface of main article, directed posteriorly ; long and thick ; bar-shaped in lateral view, subsquare with subacute apex in ventral view. Superior harpe (Fig. 3D) thin, directed dorsad, slightly curved caudally.

Female (Fig. 3H-J). Body brown, 6.5-7.0 mm long. Antenna 7.5-8.0 mm long. Scape 1.8 mm long, 3.3 times head length. Maxillary palpus 5-segmented, 1.7-1.8 mm long. Labial palpus 3-segmented, 0.8 mm long. Fore wing *ca.* 8.0 mm long, *ca.* 2.7 mm wide. Hind wing *ca.* 6.5 mm long, *ca.* 2.4 mm wide. Venation as in other Japanese species of *Goerodes* (ITO, 1984).

Genitalic segments (Fig. 3H-J). Lateral margin of tergite VIII (Fig. 3H)

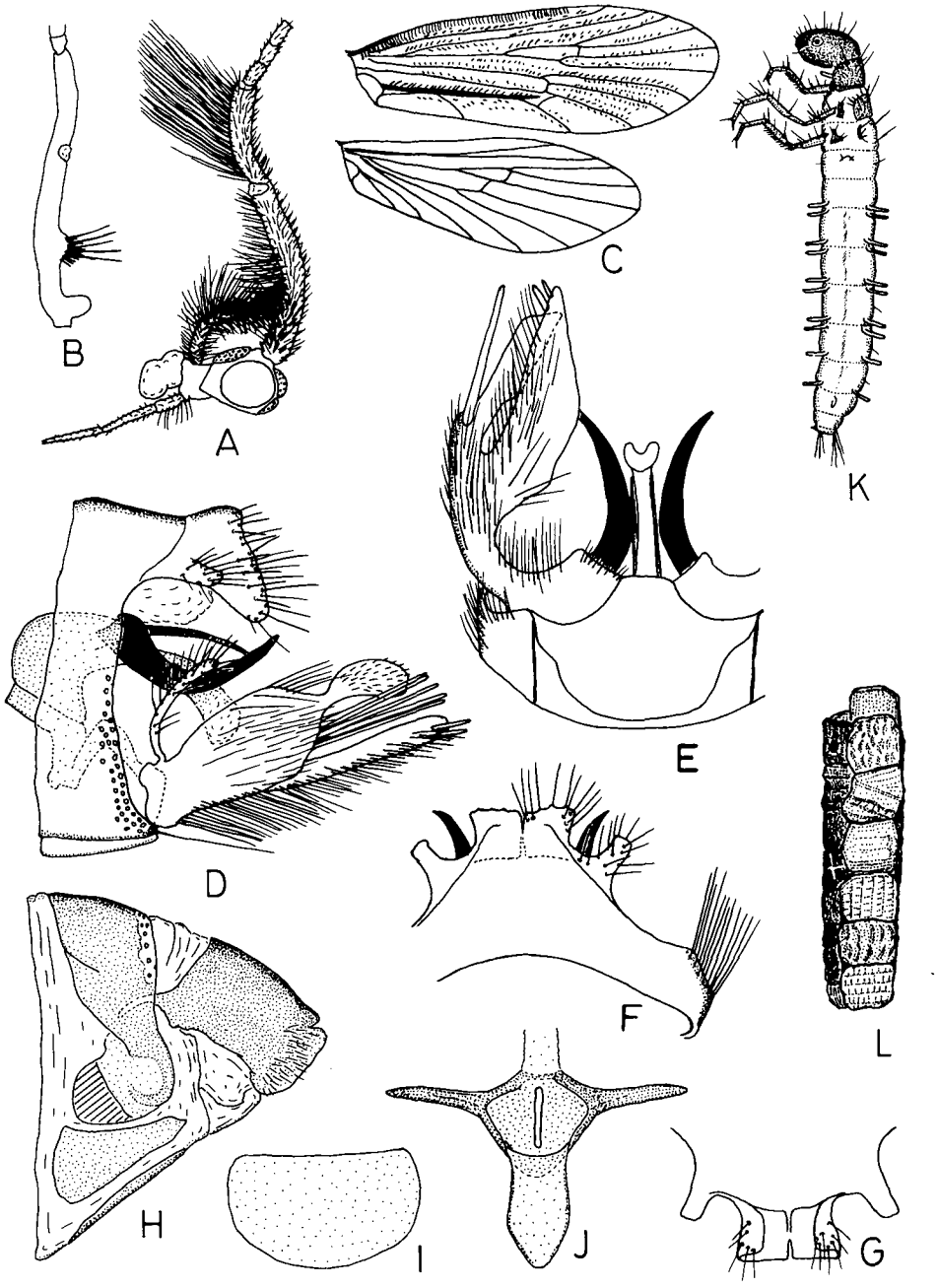

Fig. 3. *Goerodes kasugaensis* (TANI, 1971). Male (A-G) : A, head, scape and mouth parts, lateral ; B, scape, dorso-lateral ; C, wings ; D, genitalia, lateral ; E, same, ventral ; F, same, dorsal ; G, tergite X, ventral. Female (H-J) : H, segments VIII-X, lateral, shaded part shows lateral pocket ; I, subgenital plate ; J, vaginal apparatus. Larva (K). Case of 5th instar larva (L).

tapered, curved anteriorly. Sclerotized pocket (Fig. 3H) present at lateral margin of tergite VIII. Lateral plate (Fig. 3H) triangular, sclerotized weakly. Subgenital plate weakly sclerotized (Fig. 3I), subsquare with gently convex posterior margin. Vaginal apparatus (Fig. 3J) lozenge with long lateral projections ; lateral projections directed transversely with subacute apex.

Larva (Fig. 3K). Very similar to larva of *G. japonicus* in shape and size (TSUDA, 1936 ; ITO, 1985a) and indistinguishable from the latter in the present study. Body length up to *ca.* 10 mm.

Larval case (Fig. 3L). Cylindrical sand case at early instars and four-sided leaf case at 5th instar. Material and shape changed at 4th instar. Case length up to *ca.* 12 mm.

Specimens examined. Japan. Honshu. [Iwate] 7♂, Naka-zawa, 200 m, Isawa-cho, 2.VII.1995, TH. 1♂, Yamagata-mura, 24.VII.1996, T. MURAKAMI (TM). [Toyama] 1♂, Kotani-gawa, *ca.* 450 m, Taira-mura, 30.VII. 1995, light trap (L), TH. [Tokyo] 1♂, Shiroiwa-zawa, Kitaaki-gawa, Hinohara-mura, 14.VI.1987, T. NOZAKI (TN). 5♂1♀, Minami-akigawa, Hikage-sawa-deai, Hachioji, 4.VI.1991 TN & T. KAGAYA. 2♂, Yazawa, Hinohara-mura, 8.VI.1992, TN & TI. [Yamanashi] 1♂, Ojiro R., 800-1100 m, Hakushu-cho, 13.VI.1992, TH. [Shizuoka] 40♂, Funabara R., 550 m, Amagi-yugashima-cho, Izu, 18.VI.1995, TH. 30♂41♀, 6 pupae (1♂5♀), ditto, 21.IV.1996 (larvae), reared and preserved in VI.1996, TH & TI. 11 ♂9♀, ditto, 16.VI.1996, TH. 1♂, Yamadano-sawa, 220 m, Tokuna-gawa, Nakaizu-cho, Izu, 18.V.1995, TH. 2♂, Higashi-zawa, 110 m, Mariko R., Utsunoya, Shizuoka, 22.VI.1995, TH. 8♂, Nakazawa, 250 m, Shizuoka, 7. VI.1995, TH. 1♂, Higashi-zawa-deai, Umegashima, *ca.* 900 m, Shizuoka, 27.VII.1995, L, TH. 3♂, Kurobe-zawa, Hirano, Shizuoka, 1.VI.1997, TH, TI & AO. [Gifu] 19♂, Nagara-gawa, 870 m, Kamagahora, Takasu-mura, 30. VII.1995, TH. [Aichi] 2♂1♀, tributary of Shimada R., Horai, 14.VI.1997, HN. [Mie] 6♂3♀, Ôuchiyama-mura, 15.VI.1996, HN. [Wakayama] 5♂, Hirai, Kozagawa-cho, 19-21.V.1990, L, NK. 1♂, ditto, 3-4.V.1993, TI. 5♂, ditto, 28-29.V.1993, TI.

Kyushu. [Ôita] 1♂, upstream of Nagafuchi R., Kuzuha, Ume-cho, 23.V. 1993, NK. [Kagoshima] 1♂, Takakuma-keikoku, 200 m, Kamitakara-mura, Kanoya, 1.VI.1993, T. SHIMIZU (TS).

Habitat. Larvae of this species were found in mountain streams 5-10 m wide, often together with larvae of *G. japonicus*.

Distribution. Japan (Honshu, Kyushu). New to Kyushu.

Remarks. This species was originally placed in the genus *Dinarthrodes* ULMER based on the shape of antennal scape (TANI, 1971). However, the shape of this species shows typical character of the genus *Goerodes* ULMER (ITO, 1984). Thus, this species is transferred to the genus *Goerodes*.

This species belongs to the *japonicus* group of *Goerodes* (ITO, 1984), since male tergite X is symmetrical, male inferior appendage is bifurcated at apical half and larval case is changed from a cylindrical sand case to a four-sided leaf case at 4th instar.

Goerodes speculifer (MATSUMURA, 1907) n. comb.

[Japanese name : Nukabira-kakutsutsu-tobikera]

Pycnocentria speculifera MATSUMURA, 1907, 191, female.

Dinarthrodes nukabiraensis KOBAYASHI, 1964, 88-90, male ; TANI, 1971, 69-70, male ; TANI, 1977, 200, male. **New synonymy**.

Goerodes nukabiraensis : ITO, 1983, 269-275, habitat, life cycle ; ITO, 1984, 507-514 ; 64, female, pupa, larva.

Male (Fig. 4). Additional description to KOBAYASHI (1964) and TANI (1971). Shape of lateral harpe of segment X variable individually and geographically. The harpe semicircular with acute projection near middle of posterior margin (Fig. 4A) in most specimens, but projection smaller (Fig.

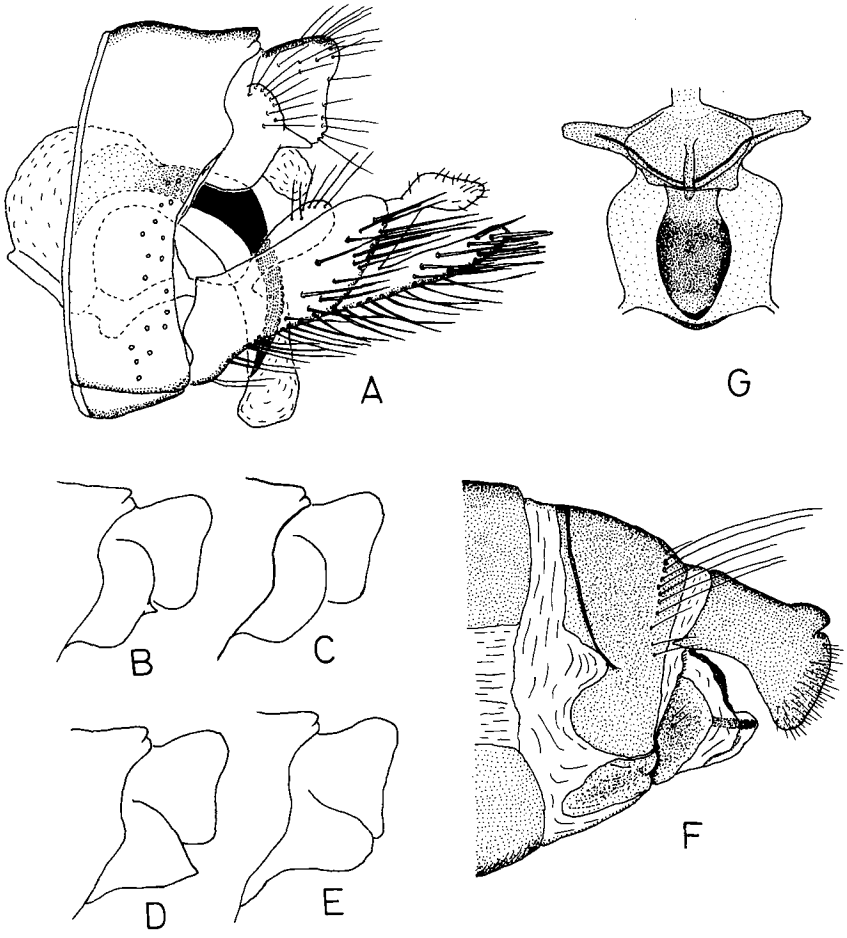

Fig. 4. *Goerodes speculifer* (MATSUMURA, 1907). Male (A-E): A, genitalia, lateral, a male from Hakushu-cho, Yamanashi ; B-E, variation of lateral harpe, lateral : B, C, males from Chitose, Hokkaido ; D, E, males from Ubuyama-mura, Kumamoto. Female (F, G) : holotype : F, segments VIII-X, lateral ; G, vaginal apparatus.

4B) or almost reduced (Fig. 4C) in some specimens from Hokkaido and Honshu. The harpe triangular with acute or round posterior corner in Kyushu specimens (Fig. 4D, E). Number of individuals of each of A, B, C, D and E are, respectively : 261, 68, 47, 0 and 0 in Hokkaido, 48, 17, 4, 0 and 0 in Honshu, and 0, 0, 0, 13 and 23 in Kyushu.

Female (Fig. 4). Additional description to ITO (1985a). Holotype. Scape 2 mm long, 3.8 times as long as head. Two pairs of round warts present on pronotum, and a pair of round warts each on mesoscutum and mesoscutellum. Tergite VIII (Fig. 4F) with round concave at antero-lateral margin. Tergites IX and X fused (Fig. 4F). Vaginal apparatus trapezoidal with long lateral projections (Fig. 4G). Lateral bands heavily sclerotized (Fig. 4G).

Specimens examined. Additional records to KOBAYASHI (1964), TANI (1971) and ITO (1985a). Japan. Holotype (*Pycnocentria speculifera* MATSUMURA) ♀, Ôkubo, 17.VII, deposited in Laboratory of Systematic Entomology, Hokkaido University, Sapporo (abdomen dissected and cleared).

[Hokkaido] 2♂1♀, Rausu-onsen, Rausu-cho, 25-26.VII.1976, TH. 24♂24♀, Motosakimui R., Shibetsu-cho, Malaise trap (M), VII-X.1996, H. KAMEI *et al.* 8♂1♀, Po R., Shibetsu-cho, 21.VIII.1996, TI & AO. 2♂, Ichani, R., Shibetsu-cho, 1995-1996, TI & AO. 15♂, Iwaobetsu, Shari-cho, 30IX.1975, TH. 1♀, Nishibetsu R., Nijibetsu-bashi, Shibecha-cho, 10.IX. 1995, TI. 1♀, Takachiishi-zawa, Yubetsu-cho, 2.VIII.1974, TH. 2♂2♀, Shumarinai, Horokanai-cho, 12.IX.1974, L, TH. 22♂32♀, Akan-kohan, Akan-cho, 1995-1997, TI & AO. 5 larvae, Otofuke R., Yonjugo-bashi, Kamishihoro-cho, 8.VI.1991, TI. 3♂, Honbetsu R., Honbetsu-cho, 1979-1980, L, TI. 1♂, Nobusha R., Mashike-cho, 11.VIII.1979 (larva), reared and emerged on 3.IX.1979, TI. 2♂1♀, Koyano-sawa, Minami-furano-cho, 17.VIII.1979, H. KAWAMURA. 2♂, Bankei-sawa, Sapporo, 20.VI.1991, K. OKAZAKI (KO). 1♂2♀, Otarunai R., Sapporo, 26.VII.1976, KO. 1♂6♀, Takino, Sapporo, 18.VII.1973, TH. 17♂53♀, ditto, 1979-1981, TI. 69♂132♀, Chitose R., Rankoshi, Chitose, 1991-1994, L, TI & Y. NAGAYASU. 2♂, Nishikioka, Tomakomai, 14.VI.1977, TH. 2♂, Misawa, Tomakomai, 14.IX.1990, NK. 3♂6♀, ditto, 1992-1993, L, TI. 2♂, Uenae R., Tomakomai, 14.IX.1990, L, TI. 2♂, Boyodai, Muroran, 13.VI.1991, TS. 2♂, Otoshibe R., Yakumo-cho, 26.VI.1991, KO. 3♂3♀, Namari R., Yakumo-cho, 29.IX.1993, TI. 2♂, upper reach of Seiyobetsu R., Imakane-cho, 20.VI. 1991, KO. 24♂8♀, Ken'ichi R., 50 m, Kumaishi-cho, VI-IX.1997, TI. 53♂68♀, Iwabuchi-sawa, Ayukawa, Kumaishi-cho, M, VI-X.1995, Y. ITO & TI. 97♂6♀ 3 pupae, Oshironai R., 50 m, Mori-machi, 1977-1979, TI. 3 pupae, Ikusa R., Nanae-cho, 8.VII.1980 (larvae), reared and stored in alcohol on 28.VII.1980, TI. 1♂, Shikabe-cho, 17.VI.1991, TS. 7♂11♀, Shiriuchi R., Shiriuchi-cho, 8-13.VII.1974, T. KUMATA *et al.* 5♂5♀, Idesu R., Shiriuchi-cho, 8.VII.1978, TI.

Honshu. [Aomori] 11♂7♀, Kumataki R., Natsusaka, Tako-cho, 3.IX. 1997, L, TI. [Akita] 4♂, Makikeikoku, Nakasen-cho, 7.X.1990, TI. [Iwate] 1♂1♀, Yakushi R., *ca.* 500 m, Taimagura, Kawai-mura, 10.VIII.1994, L, TH. 1♂, Naka-zawa, 200 m, Kamikaai, Isawa-cho, 2.VII.1995, TH. [Fuku-

shima] 2♀, Ryai-dam, 500 m, Ten'ei-mura, 26.VIII.1994, L, TH. [Niigata] 1♂, Uchinokura R., *ca.* 200 m, Shibata, 17.VII.1994, L, TH. [Toyama] 1♂ 1♀, Kotaki R., *ca.* 450 m, Taira-mura, 30.VII.1995, L, TH. [Tochigi] 5♂ 1♀, Yukawa R., Chuzenji, Nikko, 20.VI.1977, TI. [Yamanashi] 2♂, Oizumi-mura, 9.IX.1981, TI. 4♂, Doshi R., Doshi-mura, 23.IX.1994, TI. 8 ♂, Kamanashi R., *ca.* 900 m, Hakushu-cho, 15.VIII.1995, L, TH. 6 larvae, ditto, 9.VI.1996, TH. [Nagano] 5♂, Waguma R., 950 m, Ôhinata, Sanada-machi, 10.IX.1994, L, TH. 3♂, Todai, Ina, 26-27.IX.1975, TH. 2♂1♀, Oguro R., *ca.* 1400 m, Ina, 17.VIII.1996, L, TH. 1♀, Kitamatariri, *ca.* 900 m, Matsu R., Hakuba-mura, 13.VIII.1995, TH. 10♂10♀, Kuro-sawa, *ca.* 1050 m, Yokokawa R., Tatsuno-machi, 17.VIII.1996, TH. 1♀, Uhara R., Suzaka, 17.VIII.1996, K. TOJO (KT). 1♂2♀, Uchimura R., Maruko-machi, 21.VI.1997, KT. [Okayama] 1♂1♀, Myoren R., *ca.* 700 m, Kawakami-son, 16.V.1993, NK. [Tottori] 7♂11♀, Amida R., *ca.* 700 m, Daisen-cho, 25.V. 1993, NK. 1♂, tributary of Tenjin R., Kijiyama, Misasa-cho, 16.V.1993, NK. 3♂, Funatani R., 750 m, Kofu-cho, 25.V.1993, NK. [Shimane] 1♂1♀, tributary of Kando R., Kami-hashinami, Sada-cho, 17.V.1993, NK.

Kyushu. [Ôita] 2♂2♀, Kurodake-tozangushi, Shonai-cho, 20.V.1993, NK. [Kumamoto] 11♂, Ikeyama-suigen, Ubuyama-mura, 17.X.1992, HN. 3♂, ditto, 9.V.1997, HN. 201♂, Minami-koguchi-machi, 7.VII.1996, TM.

Distribution. Japan (Hokkaido, Honshu, Kyushu). New to Kyushu.

Remarks. This species was originally described under the family Sericostomatidae (MATSUMURA, 1907) but should be transferred to the family Lepidostomatidae, because the holotype has a long scape and 1 pair of round setal warts on both mesoscutum and mesoscutellum. Since the shape of segments VIII-X and vaginal apparatus of the holotype correspond with those of the female of *Goerodes nukabiraensis* (KOBAYASHI) (ITO, 1985a), I conclude that *G. nukabiraensis* is a junior synonym of this species. This species belongs to the *japonicus* group of *Goerodes* (ITO, 1984), since male tergite X is symmetrical, male inferior appendage is bifurcated at apical 2/5, and larval case is changed from a cylindrical sand case to a four-sided leaf case at 4th instar.

Goerodes iriomotensis n. sp.

[Japanese name : Iriomote-kakutsutsu-tobikera]

Goerodes arcuatus (HWANG) : ITO, 1992, 337-339, male, female, larva, case of larva. Misidentification.

Male (Fig. 5A-G). Brown, 6-7 mm long. Antenna *ca.* 11 mm long. Scape (Fig. 5A) 1.2 mm long, twice as long as head ; densely covered with scales and setae. Maxillary palpus (Fig. 5A) 2-segmented, thick and 0.9 mm long in total ; basal segment 0.3 mm long and covered with setae ; apical segment 0.6 mm long and covered with scales and setae. Labial palpus 3-segmented, 1.2 mm long in total; relative length of the 3 segments, from base to apex, 1 : 1. 1 : 1.2.

Fore wing (Fig. 5B) *ca.* 7 mm long, 2.5 mm wide; apical forks I and II

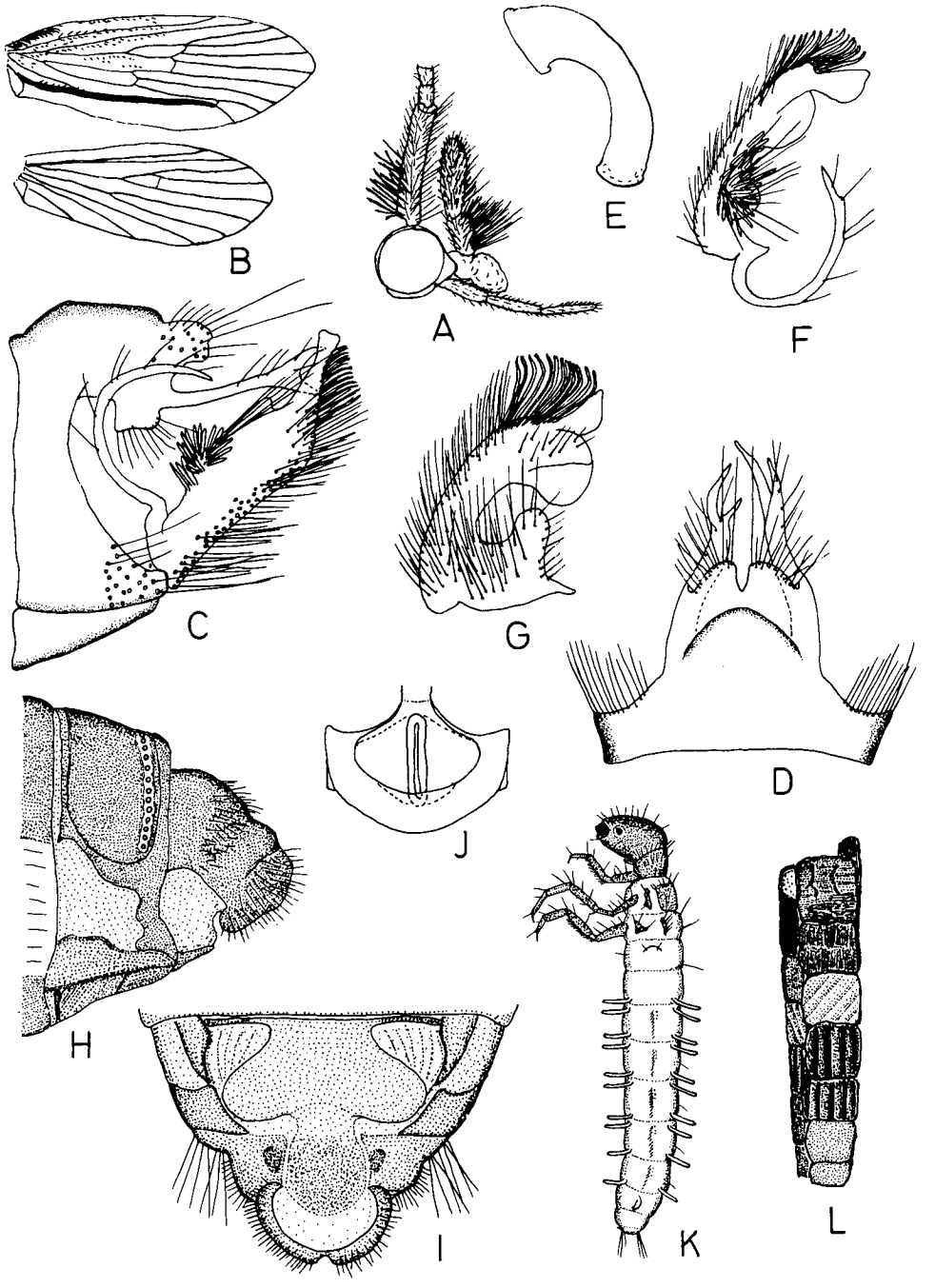

Fig. 5. *Goerodes iriomotensis* Ito n. sp. Male (A-G) : A, head, scape and mouth parts, lateral ; B, wings ; C, genitalia, lateral ; D, same, dorsal ; E, aedeagus ; F, inferior appendage, dorsal ; G, same, ventral. Female (H-J) : H, segments VIII-X, lateral ; I, same, ventral ; J, vaginal apparatus. Larva (K). Case of 5th instar larva (L).

present ; discoidal cell *ca.* 1.2 mm long ; thyridial cell 3.0 mm long ; fold along Cu. Hind wing (Fig. 5B) *ca.* 6 mm long, *ca.* 2.3 mm wide ; discoidal cell *ca.* 0.8 mm long.

Genitalia (Fig. 5C-G). Tergite X composed of mesal arm and lateral arm. Mesal arm short and semi-circulate with deep concavity midway in dorsal view (Fig. 5D) and rectangular in lateral view (Fig. 5C). Lateral arm asymmetrical and more than twice as long as mesal arm (Fig. 5C) ; right arm a little shorter than the left; both arms bifurcated 1/3 from apex. Aedeagus (Fig. 5E) thick, short and membranous at apex. Paramere absent.

Main article of inferior appendage (Fig. 5C, F, G) tapered at apical 1/3 and with ax-like apex ; ventro-apical part densely covered with thick undulate setae. Superior harpe thin, arc-like (Fig. 5C, F). Inferior harpe short round, (Fig. 5G). Inner hook large semicircular in ventral view (Fig. 5G). A hump present on dorsal side of main article 1/3 from base and densely covered with short scales and long setae (Fig. 5C, F).

Female (Fig. 5H-J). Brown, *ca.* 8 mm long. Antenna *ca.* 12.5 mm long. Scape 1.1 mm long, twice as long as head. Fore wing *ca.* 7.5 mm long and *ca.* 2.8 mm wide. Hind wing *ca.* 6.0 mm long and *ca.* 2.5 mm wide. Venation of wings as in other Japanese species of *Goerodes* (ITO, 1984).

Postero-lateral margin of tergite VIII (Fig. 5H) tapered and antero-lateral margin waved. Lateral plate (Fig. 5H) triangle, sclerotized weakly, dorsal margin waved. Subgenital plate (Fig. 5I) sclerotized very weakly ; wide lozenge with thin, elongated antero-lateral parts and round postero-lateral corners. Tergite IX separated from tergite X (Fig. 5H). Vaginal apparatus (Fig. 5J) lozenge, heavily sclerotized ; lateral projections broad and fused with thick ventral bridge.

Larva (Fig. 5K). Head width and body length : 0.95-1.00 mm and 6.0-9.5 mm in 5th instar larvae ; 0.55-0.60 mm and 4.0-5.5 mm in the 4th ; 0.33 mm and 3.3 in the 3rd. Numerous small spines present on dorsum of head of 3rd and 4th instar larvae but absent on 5th instar larvae. Primary seta 5 of head dark brown and about twice as long as seta 6. Single trachael gills present in subventral and subdorsal rows of posterior of segments II-VII and anterior of segments III-VI. Other characters as in *G. albicornis*.

Larval case (Fig. 5L). Cylindrical sand case at early instars and four-sided leaf piece case at 5th (final) instar. Materials and shape changed at 3rd instar. Length of four-sided case up to 13.5 mm.

Holotype. ♂, a tributary of Takana River, Taketomi-cho, Iriomote Island, Okinawa Pref., Japan, 15.XI.1990 (larva), reared and emerged in I.1991, TI (CBM-ZI 76652).

Paratypes. ♂, same data as holotype (CBM-ZI 76653). ♂, upstream of Urauchi River, 11 km from Gunkan-iwa, Taketomi-cho, Iriomote Island, Okinawa Pref., Japan, 16.II.1994, TS (CBM-ZI 76654).

Other specimens. 1♂1♀, same data as holotype. 1♂, Hora-gawa, Takana, Taketomi-cho, Iriomote Island, Okinawa Pref., Japan, 18.II.1994, TS. 4 larvae, type locality, 15.XI.1990, TI. 4 larvae, type locality, 28.III.1986, N. KOBAYASHI and S. ISHIWATA.

Habitat. The larvae were found in streams where bottom gravels were covered with light orange deposits, probably iron hydroxides.

Distribution. Japan (Iriomote Island).

Etymololgy. Referring to the island where type locality exists.

Remarks. Male of this species is very similar to *Goerodes taichungensis*, described from Taiwan (HSU and CHEN, 1996), but distinguishable in the characters of tergite X and inferior appendage. Right lateral arm is bifurcated and inferior harpe of inferior appendage is round in *G. iriomotensis*. Right lateral arm is not bifurcated and inferior harpe is subtriangle in *G. taichungensis*. Males of this species were misidentified as *G. arcuatus* (HWANG), originally described from Fukien (HWANG, 1957) and recorded from several localities of south-eastern China (YANG and WEAVER, 1997), and the female, larva and case of larva were described under the name of latter species (ITO, 1992).

This species belongs to the *orientalis* group of *Goerodes* (ITO, 1984), since male tergite X is asymmetrical and larva change from cylindrical sand case to a leaf four-sided case at 3rd instar.

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日本産カクツツトビケラ科の分類学的ノートと1新種の記載

伊藤富子

摘　　要

シロツノカクツツトビケラ *Goerodes albicornis* (BANKS, 1906) とカスガカクツツトビケラ *G. kasugaensis* (TANI, 1971) の雄，雌，幼虫，幼虫の筒巣を記載した。このうち，シロツノカクツツトビケラの雄，幼虫，幼虫の筒巣と，カスガカクツツトビケラの雌，幼虫，幼虫の筒巣は初記載である。主に幼虫の形質に基づいて，2種をコカクツツトビケラ属 *Goerodes* に移した。ケトビケラ科として記載されていた *Pycnocentria speculifer* MATSUMURA, 1907 の模式標本を検討して，カクツツトビケラ科に移し，ヌカビラカクツツトビケラ *Goerodes nukabiraensis* (KOBAYASHI, 1964) をこの種のシノニムとし，同種の雄交尾器の地理的変異を記載した。沖縄県西表島からイリオモテカクツツトビケラ *Goerodes iriomotensis* n. sp. の雄，雌，幼虫，幼虫の筒巣を新たに記載した。なお，この種は中国大陸東南部に分布する *G. arcuatus* HWANG として，西表島から誤って記録されていたものである。